

REMARKS/ARGUMENTS

The claim status identifiers are provided relative to the claims as presently pending and examined in the corresponding IPER.

Inventive Step

Claims 1-20 were previously deemed obvious over Scott (U.S. Pat. No. 4,313,848) in view of Bunn Jr. (U.S. Pat. No. 4,051,069). More specifically, the Examiner indicated that the specific flow rates, heights, and diameters would merely involve a change in shape, which would be an obvious matter of design choice. The applicant respectfully disagrees.

To provide an even clearer understanding of the claimed subject matter, the applicant points to the following significant facts: First, *oxidation of carbon to carbon dioxide is a two-step reaction*, in which the oxidation of carbon to form carbon monoxide is followed by another oxidation of the carbon monoxide to form carbon dioxide. Second, the *kinetic parameters for the separate oxidations are dramatically different*. Specifically, the *carbon to carbon monoxide reaction is very fast* while the conversion of *carbon monoxide to carbon dioxide is rate limiting and relatively slow*.

These significant findings are directly related to the non-obvious significance of the particular flow rates, heights, and diameters: Based on the above considerations, and further based on his calculations and observations (see *e.g.*, Examples section), the inventor calculated that the *rate constant for converting carbon to carbon monoxide may be as high as 14 orders of magnitude higher than the rate constant for converting carbon monoxide to carbon dioxide*. Such difference is confirmed by the observation that conversion of carbon to carbon monoxide is much faster than conversion of carbon monoxide to carbon dioxide. Furthermore, the substantial kinetic difference supports the inventive concept of *spatially segregating the first and second oxidation reactions* using different temperatures and/or oxygen concentration in the respective reactor sections, typically achieved by specific flow rates, heights, and diameters of the sections in a single reactor.

Consequently, it is submitted that the *specific flow rates, heights, and diameters are far from being a mere design choice, but are carefully chosen to allow the segregation of the reactions according to the thermodynamic properties*. The specific flow rates, heights, and diameters, and the spatial segregation of the two oxidation reactions are clearly neither taught nor suggested by Scott and/or Bunn Jr. Therefore, the presently pending claims should not be held obvious over Scott in view of Bunn Jr.

REQUEST FOR ALLOWANCE

Claims 1-20 are pending in this application. The applicant requests allowance of all pending claims.

Respectfully submitted,


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